Fig. 1

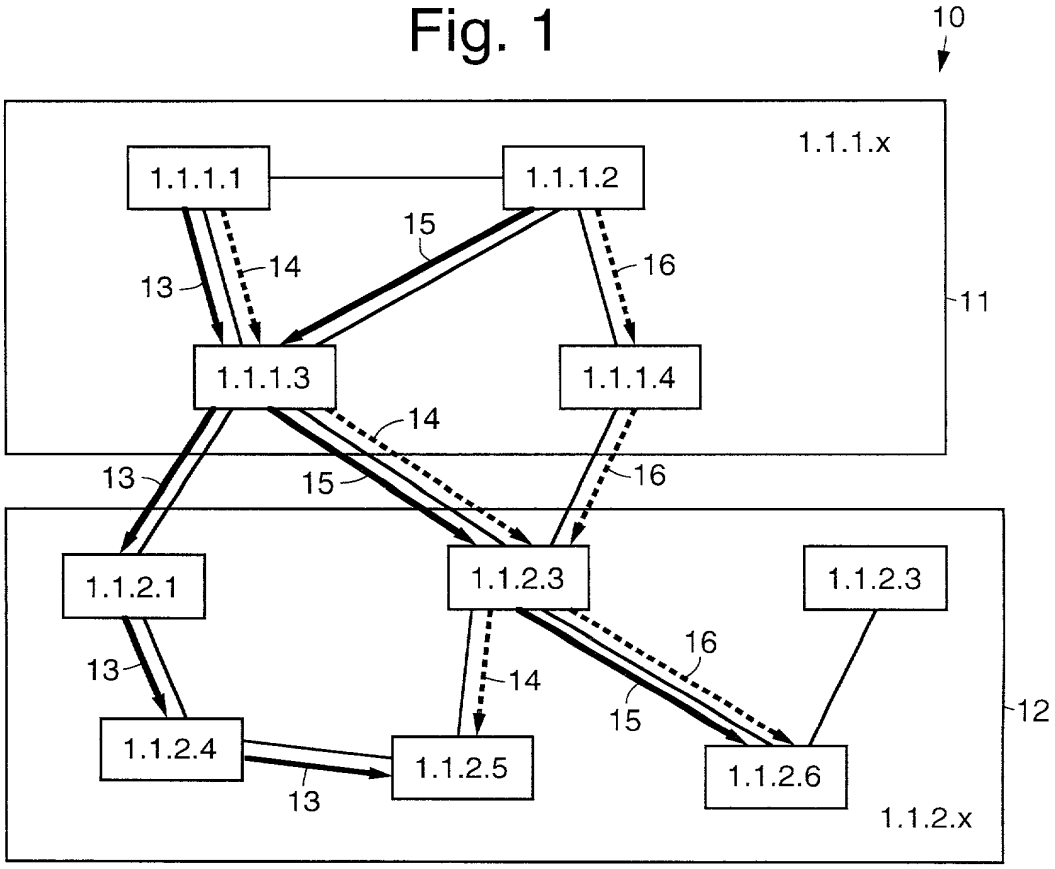

10
1.1.1.x
1.1.1.1
1.1.1.2
15
13
14
16
11
1.1.1.3
1.1.1.4
14
13
15
16
1.1.2.1
1.1.2.3
1.1.2.3
16
13
14
15
12
1.1.2.4
1.1.2.5
1.1.2.6
13
1.1.2.x

Fig. 2

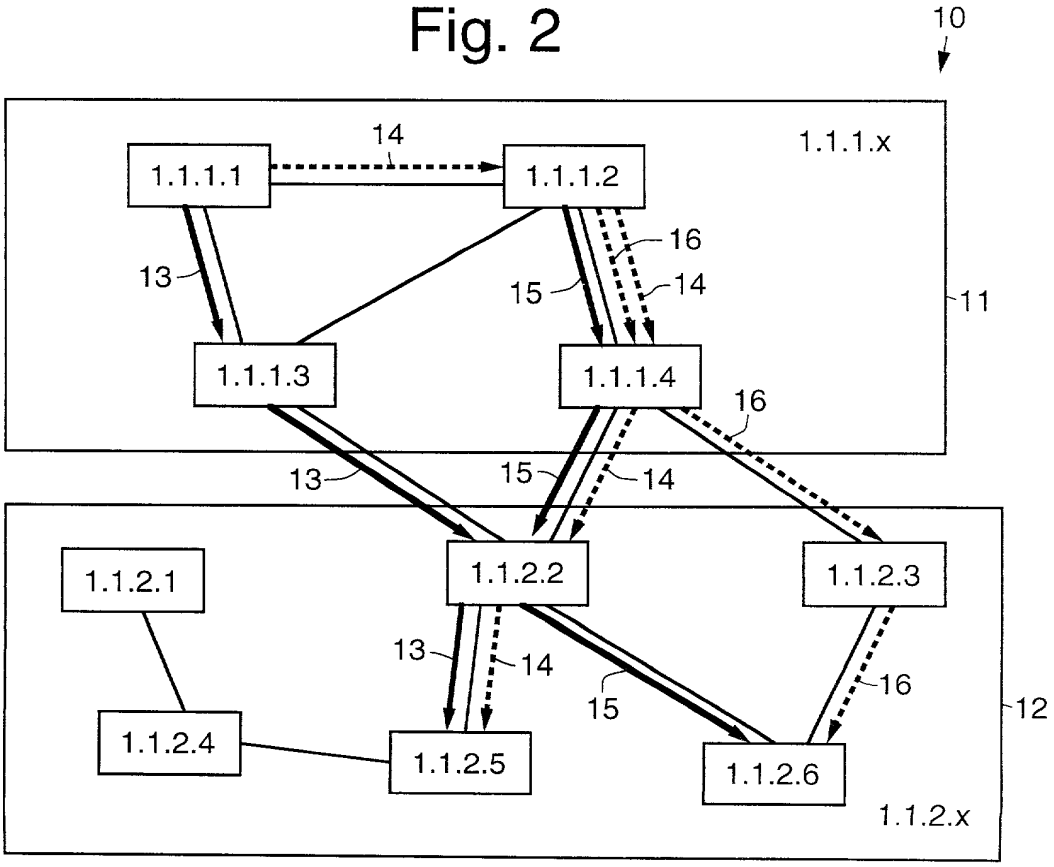
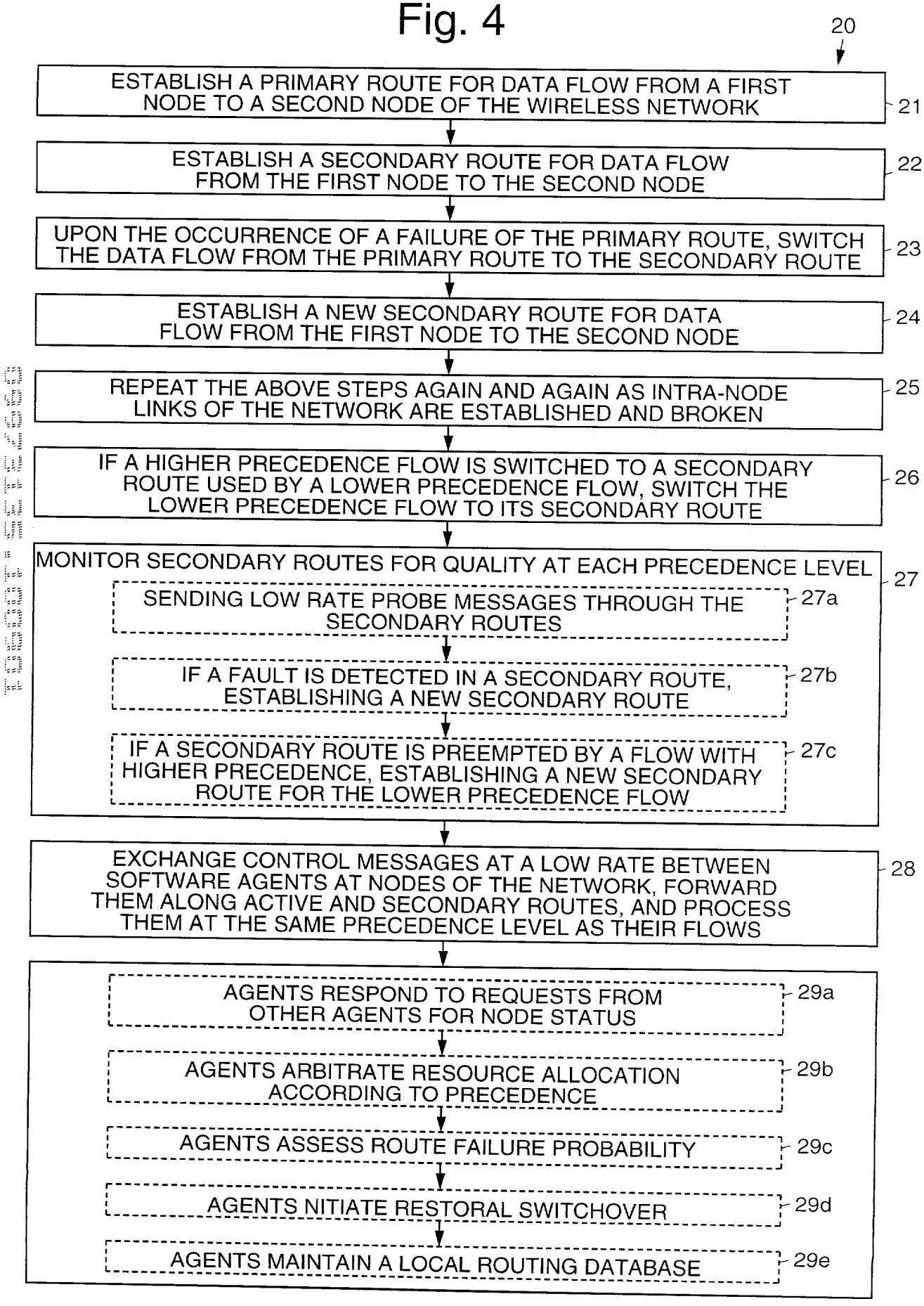

10
14
1.1.1.x
1.1.1.1
1.1.1.2
16
13
15
14
11
1.1.1.3
1.1.1.4
16
13
15
14
1.1.2.1
1.1.2.2
1.1.2.3
13
14
15
16
12
1.1.2.4
1.1.2.5
1.1.2.6
1.1.2.x

Fig. 3

Signal Type	Signal Contents	Node Activity	Summary of Effects
RREQ – Route request	Destination ID Stream ID Precedence level BW desired QoS desired Link IDs traversed Cost incurred	A node will transmit this to all nodes that, from the topology map, could lie on a valid route, unless previous route discovery had shown they required a higher precedence	The update messages have provided a topology map at the node that may no longer be completely accurate, but does know which next nodes make sense. Eg, if there is SATCOM, a node might forward an RREQ backwards from the destination to get to a SATCOM gateway. As knowledge of what precedence can be supported by the various links, the RREQs would not be directed towards congested areas.
RREP – Route reply	Destination ID Stream ID Precedence level BW granted QoS granted Link IDs traversed Cost incurred Return path IDs traversed	This packet is propagated back up the chain of links of the lowest cost route, activating them for the stream, and along the next lowest cost, reserving capacity for failover	In addition to allocating resources, each node traversed notes the RREP contents so as to update the topology and to add information as to the capability of the links. Note that for nodes close to this destination, most of the route, except for the very final legs, could still be appropriate
NRREP – Negative route reply	Destination ID Stream ID Link IDs traversed Link ID that rejected Reason for rejection	This packet is transmitted back up the chain of links to the source. It is also used to notify lower precedence streams that they are being canceled	The NNREP will tell where bottlenecks are. These might be due to either demand by higher precedence traffic or to lowered capacity of the link. In either case, this becomes a hole in the topology for lower precedence traffic.
PCANN Precedence Change Announcement Node ID	Destination ID Precedence level affected Add/Drop Timing	A node sends this to neighbor nodes that would transmit into it for relay to Destination announcing a pending change in allowed precedence levels, either added or dropped.	These signals are used when a node recognizes a change in precedence levels being passed (timing = 0.0) or anticipates such a change (timing > 0). If there are affected routes, appropriate new RREQs would be generated if precedence level is dropped, or new RREPs would be issued if precedence level added. One affect is to keep low precedence RREPs out of congested areas.

Fig. 4


20
ESTABLISH A PRIMARY ROUTE FOR DATA FLOW FROM A FIRST NODE TO A SECOND NODE OF THE WIRELESS NETWORK
21
ESTABLISH A SECONDARY ROUTE FOR DATA FLOW FROM THE FIRST NODE TO THE SECOND NODE
22
UPON THE OCCURRENCE OF A FAILURE OF THE PRIMARY ROUTE, SWITCH THE DATA FLOW FROM THE PRIMARY ROUTE TO THE SECONDARY ROUTE
23
ESTABLISH A NEW SECONDARY ROUTE FOR DATA FLOW FROM THE FIRST NODE TO THE SECOND NODE
24
REPEAT THE ABOVE STEPS AGAIN AND AGAIN AS INTRA-NODE LINKS OF THE NETWORK ARE ESTABLISHED AND BROKEN
25
IF A HIGHER PRECEDENCE FLOW IS SWITCHED TO A SECONDARY ROUTE USED BY A LOWER PRECEDENCE FLOW, SWITCH THE LOWER PRECEDENCE FLOW TO ITS SECONDARY ROUTE
26
MONITOR SECONDARY ROUTES FOR QUALITY AT EACH PRECEDENCE LEVEL
27
SENDING LOW RATE PROBE MESSAGES THROUGH THE SECONDARY ROUTES
27a
IF A FAULT IS DETECTED IN A SECONDARY ROUTE, ESTABLISHING A NEW SECONDARY ROUTE
27b
IF A SECONDARY ROUTE IS PREEMPTED BY A FLOW WITH HIGHER PRECEDENCE, ESTABLISHING A NEW SECONDARY ROUTE FOR THE LOWER PRECEDENCE FLOW
27c
EXCHANGE CONTROL MESSAGES AT A LOW RATE BETWEEN SOFTWARE AGENTS AT NODES OF THE NETWORK, FORWARD THEM ALONG ACTIVE AND SECONDARY ROUTES, AND PROCESS THEM AT THE SAME PRECEDENCE LEVEL AS THEIR FLOWS
28
AGENTS RESPOND TO REQUESTS FROM OTHER AGENTS FOR NODE STATUS
29a
AGENTS ARBITRATE RESOURCE ALLOCATION ACCORDING TO PRECEDENCE
29b
AGENTS ASSESS ROUTE FAILURE PROBABILITY
29c
AGENTS NITIATE RESTORAL SWITCHOVER
29d
AGENTS MAINTAIN A LOCAL ROUTING DATABASE
29e